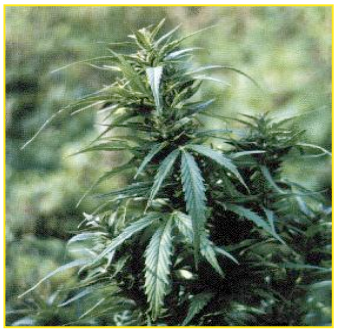
Marijuana—May, 2010

An Update from the National Institute on Drug Abuse



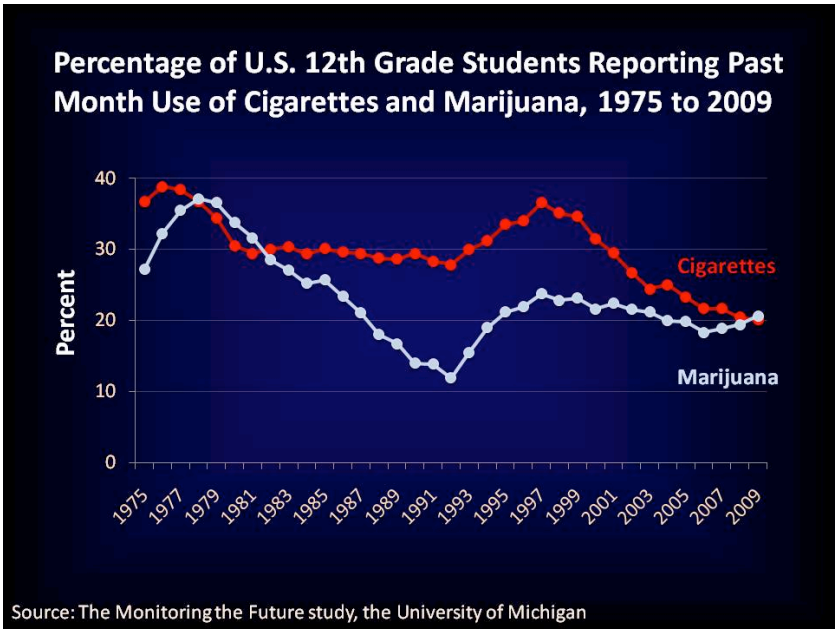
Marijuana Abuse in the United States

In 2008, nearly 26 million Americans (10%) aged 12 or older reported abusing marijuana within the past year and more than 4 million met DSM-IV criteria for abuse or dependence (addiction).

According to NIDA's Monitoring the Future study, while marijuana use among 8th, 10th, and 12th graders showed a consistent decline starting in the mid-1990s; this decline has stalled in the past few years. Past month use was reported by 6.5% of 8th graders, 15.9% of 10th graders, and 20.6% of 12th graders, or 1 in 5 seniors. Thus, marijuana use does not reflect the continuing downward trend occurring with cigarettes (see figure). Among 12th graders, 5.2% are daily marijuana users, a rate unchanged since peak years in 2002 and 2003 (6%).

Marijuana's Effects

Marijuana is derived from plant containing more than 400 chemical constituents. Tetrahydrocannabinol (THC) is the main psychoactive ingredient in marijuana. It binds to cannabinoid (CB) receptors, widely distributed throughout the nervous system, and other parts of the body. In the brain CB receptors are found in high concentrations in areas that influence pleasure, memory, thought, concentration, sensory and time perception, appetite, pain, and movement coordination. This is why marijuana can have wide ranging effects, including:



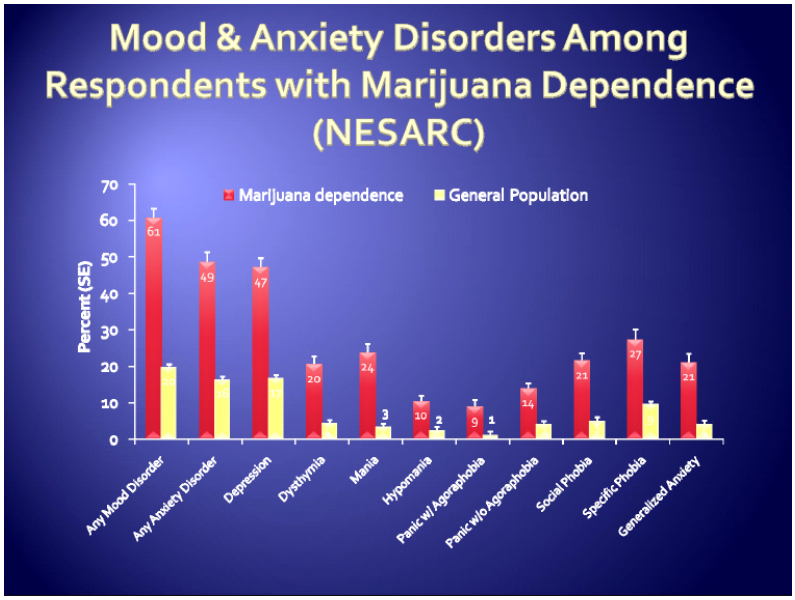
- Impaired short-term memory (memory of recent events)--making it hard to learn and retain information, particularly complex tasks.
- Slowed reaction time and impaired motor coordination—throwing off athletic performance, impairing driving skills, and increasing the risk of injuries
- Altered judgment and decisionmaking—possibly leading to high-risk sexual behaviors, that could lead to the spread of HIV or other sexually transmitted diseases.
- Increased heart rate by 20-100%--may increase the risk of heart attack, especially in otherwise vulnerable individuals
- Altered mood--euphoria, calmness, or in high doses, anxiety, paranoia
- *Exposure during critical developmental periods*: From animal research, THC exposure pre- or perinatally or during adolescence can alter brain development, particularly in areas related to mood, reward, and executive function (e.g., cognitive flexibility)

<u>Long term marijuana abuse:</u>

- Risk of addiction
- Poorer educational outcomes and job performance, diminished life satisfaction
- Respiratory problems—chronic cough, bronchitis
- Risk of psychosis in vulnerable individuals
- Cognitive impairment persisting beyond the time of intoxication

Marijuana and Mental Illness

People who are *dependent* on marijuana frequently have other comorbid mental disorders (see figure). Population studies reveal evidence of an association between cannabis use and increased risk of schizophrenia and, to a lesser extent, depression, and anxiety. There are now sufficient data indicating that marijuana may trigger the onset or relapse of schizophrenia in people predisposed to it, perhaps also intensifying their symptoms.



Marijuana and Addiction

Long-term marijuana use can lead to addiction; that is, people use the drug compulsively even though it interferes with family, school, work, and recreational activities. According to the National Survey on Drug Use and Health, in 2008 of the estimated 7 million Americans classified with dependence on or abuse of illicit drugs, 4 million were dependent on or abused marijuana. In 2007, 15.8% of people entering drug abuse treatment programs reported marijuana as their primary drug of abuse (61% of those under 15), representing nearly 288,000 treatment admissions. Along with craving, withdrawal symptoms such as irritability, sleeping problems, and anxiety can make it difficult for long-term marijuana smokers to quit. Past research has shown that approximately 9% of people who used marijuana may become dependent. The risk of addiction goes up to about 1 in 6 among those who start using as adolescents, and 25-50% of daily users.

Treatment for Marijuana Addiction

While no medication currently exists to treat marijuana addiction, a number of behavioral therapies have been shown to work: motivational incentives (awarding vouchers or "prizes" for abstinence) motivational enhancement (helping people increase their personal motivation to quit), and cognitive behavioral therapy (teaching patients new coping strategies).

Research has found that a cannabinoid antagonist can block marijuana's subjective effects. However, this medication does not have FDA approval in this country (it is approved for treating obesity in Europe), and compliance may be an issue because of the potential for depression/anxiety associated with its use. Also, preliminary research has shown that oral THC combined with lofexidine, (historically used to treat hypertension) helps to ease symptoms associated with withdrawal. Research regarding medications for marijuana addiction is ongoing.

Marijuana as Medicine

Marijuana is not an FDA approved medicine, although 14 states have currently legalized its medical use. There are data supporting marijuana's potential therapeutic value for symptoms including pain relief, control of nausea, and appetite stimulation (IOM, 1999). However, there are several reasons why marijuana is an unlikely medication candidate: (1) it is an unpurified plant containing numerous chemicals with unknown health effects, (2) it is typically consumed by smoking further contributing to potential adverse effects, and its non-patentable status makes it an unattractive investment for pharmaceutical companies.

The promise lies instead in medications developed from marijuana's active components, the cannabinoids, or (perhaps less so) for the development of alternative delivery systems for marijuana consumption. The goal in developing purified or synthetic derivatives of marijuana's active components is to design more tailored medications with improved risk/benefit profiles. A number of cannabinoid-based medications are under investigation with some already approved, that harness the new knowledge and therapeutic potential of this system for treating: pain associated with multiple sclerosis, obesity and metabolic disorders, neurodegenerative diseases, and addiction.